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## THE FLORA OF THE SAND BARRENS OF SOUTHERN STATEN ISLAND

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My first visit to this interesting region was on the 19th of September, 1901. The day was one of those perfect ones after a rain storm; and my companion Mr. J. C. Buchheister, familiar with this locality, was a most excellent guide, showing me where many rarities grew. To reach the barrens, one should start about 7 A.M., and after leaving the ferry at St. George, take the Staten Island Rapid Transit to Huguenot, where one leaves the train, walking westward along Huguenot Avenue to Rossville. The surface of the Island here, as elsewhere, is rolling, and from the hilltops fine views may be had of the Jersey shore and Orange mountains, across Staten Island Sound and the intervening salt marshes. Along this country road many plants grew, the large purple foxglove, *Agalinis purpurea* (L.) Britton, with its showy rose-colored flowers, was conspicuous in moist grassy places, not only here but also along the railroad from St. George. Over the shrubby growth of sassafras, dwarf sumac and small trees of sour gum and black cherry, the catbrier, *Smilax rotundifolia* L. clambers, guarding the trumpet honeysuckle, *Lonicera sempervirens* L., which was both in flower and fruit, against intruders. Other interesting plants occur, as *Panicum dichotomiflorum* Mx.; *Juncus acuminatus* Mx.; *Agrimonia parviflora* Soland.; *Apocynum sibiricum* Jacq.; *Phlox paniculata* L.; matrimony vine, *Lycium halimifolium* Mill., escaping from old gardens; *Koellia mutica* (Mx.) Britton easily recognized by its whitened upper leaves; and the rice-button and calico asters, *Aster dumosus* L. and *Aster lateriflorus* (L.) Britton.

Rossville with its quaint old Revolutionary hostelry, Sherman  
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Inn, is surrounded on one side by extensive salt marshes, from which considerable hay was made from the marsh grasses, composed largely of the marsh spike-grass, *Distichlis spicata* (L.) Greene. Several plants were observed here, it being the only place where we attempted to go on the salt marshes. The sea lavender, *Limonium carolinianum* (Walt.) Britton casts a purplish glow over the marshes, broken here and there by patches of the sea-side goldenrod, *Solidago sempervirens* L. Several other coastal plants were found: *Cyperus filicinus* Vahl; *Cyperus speciosus* Vahl; *Scirpus robustus* L.; *Polygonum ramosissimum* Mx.; *Tissa marina* (L.) Britton; *Agalinis maritima* Raf.; *Plantago maritima* L.; *Aster subulatus* Mx.; *Aster tenuifolius* L. and marsh elder, *Iva frutescens* L. The swamp rose mallow, *Hibiscus moscheutos* L., occurs, but was not abundant enough to make the show that this plant usually does. About the edges of the marshes in the woodlands, one finds large tufts of several of the grasses, *Andropogon furcatus* Muhl., *Aristida purpurascens* Poir, *Panicum virgatum* L. and *Sorghastrum nutans* (L.) Nash. Here were rosy patches of the purple milkwort, *Polygala viridescens* L.; the clammy cuphea, *Parsonia petiolata* (L.) Rusby, which Mr. Buchhesiter said "discharged its seeds from the capsule before they were ripe"; *Koellia flexuosa* (Walt.) MacM.; *Bidens comosa* (Gray) Wieg. and the ox-eye, *Heliposis helianthoides* (L.) BSP.

Following the road again, about half the distance to Kreiserville, we find one of the most interesting spots in the New York state flora, the meeting of the northern and southern floras. The pine barrens of the Island are sandy wastes, covered with a growth of oaks; the black-jack oak, *Quercus marylandica* Muench.; post oak, *Quercus stellata* Wang., and the black oak, *Quercus velutina* L.; also I believe some of the hybrid oaks grow here. The pitch pine, *Pinus rigida* Mill., and mocker-nut, *Hicoria alba* (L.) Britton, occur in a dense undergrowth of peculiar and interesting plants. In many places one could gather quantities of salt-water clam shells in the sand, showing that at a comparatively recent period this portion of the Island was submerged.

On the barrens the glaucous-leaved catbrier, *Smilax glauca* Walt., clammers over the dwarf sumac, *Rhus copallina* L., the beach plum, *Prunus maritima* Wang., and the stagger-bush. The stagger-bush, *Neopteris mariana* (L.) Britton, is a handsome shrub with a reddish stem, coriaceous leaves and rather large snow-white flowers; although the flowering season was past, a few flowers remained. The bayberry family was represented by the very abundant sweet fern, *Comptonia peregrina* (L.) Coult., and the bayberry, *Myrica carolinensis* Mill. Many herbaceous plants cover the ground—*Cyperus Grayi* Torr.; *Stenophyllus capillaris* (L.) Britton; *Juncus scirpoides* Lam.; *Comandra umbellata* (L.) Nutt.; the pinkish white coast jointweed, *Polygonella articulata* (L.) Meisn.; the large-flowered sensitive-pea, *Chamaecrista fasciculata* (Mx.) Greene; wild indigo, *Baptisia tinctoria* (L.) R. Br.; wild ipecac, *Tithymalopsis Ipecacuanhae* (L.) Small, a characteristic plant, the basal leaves forming rosettes in the clear sand and the foliage often tinged with purple; dense tufts of beach heather, *Hudsonia tomentosa* Nutt.; *Lechea Leggettii* Britton & Hollick; *Viola fimbriatula* J. E. Sm.; the prickly pear, *Opuntia opuntia* (L.) Coult.; *Asclepias amplexicaulis* J. E. Smith; the butterfly-weed, *Asclepias tuberosa* L.; the horse mint, *Monarda punctata* L.; buttonweed, *Diodia teres* L.; the "golden-eye," *Chrysopsis mariana* (L.) Nutt. with large yellow flowers; *Aster patens* Ait.; *Eupatorium rotundifolium* L.; *Solidago odora* Ait., the most abundant goldenrod; and gall-of-the-earth, *Nabalus serpentarius* (Pursh) Hook. One was obliged to pick his way carefully through this undergrowth and steer clear of the tick-trefoils, *Meibomia canadensis* (L.) Kuntze; *Meibomia marylandica* (L.) Kuntze; *Meibomia paniculata* (L.) Kuntze and *Meibomia rigida* (Ell.) Kuntze. A search was made for a small persimmon tree, *Diospyros virginiana* L., but it was not found; later in the day one was seen near Kreischer-ville, shedding its brownish leaves. Along a small stream flowing through the barrens, the narrow-leaved chain-fern, *Lorinseria areolata* (L.) Presl., grew in company with the common cinnamon fern. One might easily pass the chain-fern over, calling it the sensitive fern, if the fertile fronds were not seen.

A hog-nosed snake, brownish with a few markings and a broad flat head was seen; it lay very quiet and did not attempt to move away. Near the stream where the chain-fern grew, we stopped a few minutes for lunch; an old lady passed and went into the woods with her hand-saw, soon returning with a bundle of dry sticks. She looked quite quaint and old-fashioned, and asked us if the water was good.

Several of the clay beds, which have made this portion of the Island famous, were visited. The clay deposited here when the great Laurentian glacier moved down from the north is bluish in color and very fine-grained. The clay beds lie beneath the glacial till soil of the Island and often two or three different colored sands are found in the same pit, and curiously shaped red sandstone nodules. These valuable beds are said to have been first worked by Mr. Kreischer over 50 years ago, the industry of making brick, tile and stoneware giving employment to many of the inhabitants of this portion of the Island. One of the abandoned clay pits was an interesting club-moss locality; growing in a small area were plants of *Lycopodium adpressum* (Chapm.) Lloyd & Underw., *Lycopodium alopecuroides* L., *Lycopodium inundatum* L., and Mr. William H. McDonald's form of *Lycopodium adpressum*, which was described as forma *polyclavatum* McDonald in the Fern Bulletin 9: 8-9. Jan. 1899, the main distinction from the species being that the fruiting portion bears from 2-6 spikes. Clute's variety of the common braken, *pseudocaudatum*, "which differs from the species in its longer, narrower and more distinct pinnules" together with fine plants of the nodding ladies' tresses, *Ibidium cernuum* (L.) House; the orange-grass, *Sarothra gentianoides* L.; *Viola emarginata* (Nutt.) Le Conte; *Viola lanceolata* L.; *Viola primulifolia* L. and *Bartonia virginica* (L.) BSP. occur. Search was made for the savin-leaved club-moss, *Lycopodium sabinaefolium* Willd., which Mr. Buchheister said grew here, but a fire had probably destroyed it. Another abandoned clay pit yielded *Rynchospora glomerata* (L.) Vahl; the slender yellow-eyed grass, *Xyris flexuosa* Willd.; *Polygala Nuttallii* DC.; the hairy thoroughwort, *Eupatorium pubescens* Muhl. and the vervain thoroughwort, *Eupatorium verbenaefolium* Mx.

The woods about the pits were rather moist and largely composed of oak and maple with considerable underbrush. A few small trees of the Jersey pine, *Pinus virginiana* Mill., were found. Here were found the following plants: *Botrychium dissectum* Spreng.; *Panicum dichotomum* L.; *Panicum cladezinum* L.; *Panicum linearifolium* Scribn.; *Panicum sphaerocarpon* Ell.; the strawberry-bush, *Euonymus americanus* L.; *Viola Brittoniana* Pollard; the cowbane, *Oxypolis rigidius* (L.) Coult. & Rose; the sweet pepperbush, *Clethra alnifolia* L.; spotted prince's pine, *Chimaphila maculata* (L.) Pursh; the pinesap, *Hypopitys Hypopitys* (L.) Small; Indian pipe, *Monotropa uniflora* L.; *Cuscuta gronovii* Willd.; cowwheat, *Melampyrum lineare* Lam.; beechdrops, *Leptamnium virginianum* (L. Raf.), purple and yellowish plants, and *Ionactis linariifolius* (L.) Greene, the sandpaper starwort, with blue and white rays.

Continuing our journey along the road, we soon passed through Kreischerville, where by the roadside was found Dr. Torrey's old variety *obtusilobata* of the sensitive fern, the variety here arising by the cutting of the early sterile fronds by a scythe. We finally reached Tottenville, where we rambled over the beach, while waiting for a late train to bear us back to the heart of the metropolis. The plants noted here were the rockweed, *Fucus vesiculosus* L., and sea lettuce, *Ulva latissima* Lam., and the sea-beach orache, *Atriplex arenaria* Nutt. A small cultivated tree of paper mulberry, *Papyrius papyrifera* (L.) Ktze., was found. The result of this trip was a large vasculum and portfolio crammed full of plants, representatives of about 120 species, 33 of which I had never seen growing in their native habitats.

My second visit was on as auspicious a day as the first, the 29th of May, 1902. I went over practically the same ground as on the previous trip; although the spring flora was not as interesting, yet I felt repaid for the effort. The red cedars along Huguenot Avenue had suffered quite severely from the ice-storm of the preceding winter. The Carolina dwarf dandelion, *Krigia virginica* (L.) Willd., was the most conspicuous flower in bloom, abundant everywhere and appearing as a weed in meadows. The trumpet honeysuckle was in full bloom; and flowering and

fruiting plants of the sweet vernal grass, *Anthoxanthum odoratum* L.; *Carex complanata* Torr. and *Carex squarrosa* L. On the salt marshes at Rossville were found black-grass, *Juncus Gerardi* Lois. Along the roadsides from Rossville to the sand barrens were found *Bromus tectorum* L.; the bulbous buttercup, *Ranunculus bulbosus* L.; *Lepidium apetalum* Willd.; the common vetch, *Vicia sativa* L., clambering over the herbaceous vegetation; and the yard form of *Viola papilionacea* Pursh.

On the barrens several new finds were recorded: *Carex folliculata* L.; spiderwort, *Tradescantia virginiana* L.; *Unifolium canadense* (Desf.) Greene, very abundant; the stargrass, *Hypoxis hirsuta* (L.) Cov.; *Sisyrinchium arenicola* Bicknell; two flowering plants of the stemless ladies' slipper, *Fissipes acaulis* (Ait.) Small; low thorny shrubs of *Crataegus uniflora* Muench.; *Aronia atropurpurea* Britton; *Rubus nigrobaccus* Bailey; wild ipecac in flower; frostweed, *Crocyanthemum canadense* (L.) Britton; sheep laurel, *Kalmia angustifolia* L.; the white swamp azalea, *Azalea viscosa* L. One small shrub of *Ilex opaca* Ait. was seen. The holly is very rare on Staten Island now; formerly it was probably more plentiful here, before there was such a demand for it as a Christmas green.

Along the brook which flows through the barrens, *Viola cucullata* Ait. was in bloom. A box turtle was found near the stream, shedding the plates of its shell. The plastron of the shell of this tortoise is provided with a remarkable double hinge; which pulls the front and rear ends up close to the carapace in times of danger, and serves as a great protection from enemies. Small zigzag banks of earth, four or five feet high, which had been built many years ago along the stream, remained quite intact, being held together by a shrubby and herbaceous growth. Dr. Arthur Hollick afterwards told me that these were built for the cultivation of water-cress. The stream was full of golden saxifrage, *Chrysosplenium americanum* Schwein., which had nearly choked out the surviving cress.

In the woods about the clay pits the wild pink, *Silene caroliniana* Walt., grew sparingly; *Arabis lyrata* L.; black huckleberry, *Gaylussacia baccata* (Wang.) C. Koch; late low blueberry.

*Vaccinium vacillans* Kalm; blue toad-flax, *Linaria canadensis* (L.) Dum. and rattlesnake-weed, *Hieracium venosum* L., with basal leaves green and purple-veined were also found. In the woods west of Kreischerville a small patch of primrose-leaved violet in bloom; and along the road, escaping from old gardens, the star-of-Bethlehem, *Ornithogalum umbellatum* L., were noted.

These were some of the more conspicuous plants which were recorded in my notebook. To those who are unfamiliar with the flora of New York City, the metropolis would seem an uninteresting botanical field. This is only one of the many excursions that may be taken in the city, and much of the original flora still exists.

HUDSON FALLS, N. Y.

## OBSERVATIONS ON CALOPOGON PULCHELLUS IN LAKE CO., INDIANA

BY EDWIN D. HULL

This species, which is fairly abundant near Hammond, differs widely in its time of flowering according to the habitat in which it grows. The 7th edition of Gray's Manual gives July as the flowering time in the range covered by that book. In this region, however, it may bloom nearly a month earlier. Here among the beach ridges of the old Lake Chicago plants are to be found in two very different habitats. More numerous and vigorous plants are found in depressions between the ridges with a typical swamp or bog flora. In one of these depressions I found *Calopogon* very abundant. Occurring with it were various species of true moss, a little *Sphagnum*, *Equisetum arvense*, *E. fluviatile*, *Lycopodium inundatum*, *Carex Oederi pumila*, *Pogonia ophioglossoides*, *Liparis Loeselii* and *Drosera rotundifolia*. Most of these, although not all, are typical bog forms. This particular depression, therefore, partakes more of the nature of a bog than an ordinary swamp. It is evidently fed by springs, and standing water can be found the year round. All the other depressions about it contain only the ordinary swamp flora. Here in this bog